

DELTA Test Report

TEST REPORT issued by an Accredited Testing Laboratory



Emission test to FCC requirements of DeLaval Activity meter AM2

Performed for DeLaval International AB

REC-E703572_3 Rev. C

Project no.: E703572

Page 1 of 34

including 1 annex.

06 February 2015

**DELTA Development
Technology AB**
Finnslätten
Elektronikgatan 47
721 36 Västerås
Sweden

Tel. 021-31 44 80
Fax 021-31 44 81
info@delta-dt.se
www.delta-dt.se

Bankgiro 5534-7728
VAT SE 556556207001

DELTA Development
Technology AB
is a subsidiary company of
DELTA

Title Emission test to FCC requirements of DeLaval Activity meter AM2

Test object DeLaval Activity meter AM2

Report no. REC-E703572_3 Rev C

FCC-/IC ID. FCC ID UCS86295081 / IC 6576A-86295081

Test period 04 June 2013 to 28 June 2013 and 19 June 2014

Client DeLaval International AB
Gustav De Lavals väg 15
147 41 Tumba
Sweden

Contact person Anders kvist
E-mail: anders.kvist@delaval.com

Manufacturer DeLaval International AB

Specifications FCC:47 CFR Part 15, subpart C
IC RSS-GEN, issue 4, IC RSS-210, issue 8

Results The test object was found to be in compliance with the specifications, as listed in Section 1

Test personnel Lars Johnsson

Date 06 February 2015

Project Manager


Lars Johnsson
DELTA

Responsible


Ulf Bjerke. Technical manager
DELTA



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1. Summary of tests

| Tests | Test methods | Results |
|--|---|---------|
| Measurement of radio frequency voltage on mains | ANSI C63.4:2009 FCC CFR 47, Part 15, Subpart C clause 15.207 IC RSS Gen, Issue 4, section 7.2.4 | Passed |
| Measurement of radio frequency electromagnetic field | ANSI C63.4:2009 FCC CFR 47, Part 15, Subpart C clause 15.209 IC RSS Gen, Issue 4, section 7.2.5 | Passed |
| Measurement of occupied bandwidth | FCC CFR 47, Part 15, Subpart C clause 15.231c IC RSS 210, Issue 8, A1.1 | Passed |
| Measurement of peak output field strength of fundamental | FCC CFR 47, Part 15, Subpart C clause 15.231b IC RSS 210, Issue 8, A1.3 | Passed |
| Periodic operation | FCC CFR 47, Part 15, Subpart C clause 15.231a IC RSS 210, Issue 8, A1.1.1 | Passed |

Conclusion

The test object(s) mentioned in this report meet(s) the requirements of the standard(s) stated below.

FCC:47 CFR Part 15, subpart C
IC RSS-GEN, issue 4
IC RSS-210, issue 8

The test results relate only to the object(s) tested.



2. Test object(s) and auxiliary equipment



Photo 2.1.1 Test object; activity meter (AM).



Photo 2.1.2 Test objects 2.1.4 activity meters

2.1 Test object(s)

Test object details can be seen in Annex 1.

The system consists of an Activity meter (**AM2**) that is placed around the neck of the cow. The activity meter contains a sensor which detects the cow's movements. The movements are registered and transmitted to the Activity receiver (**AR2**) every hour.

The system helps to detect cows in heat by the fact that cows are more active than usual during the pre-heat and heat period.

Common information

| | | |
|------------------|-----|---|
| FCC ID | AM2 | UCS86295081 |
| IC | AM2 | 6576A-86295081 |
| Manufacturer | | DeLaval International AB |
| Supply voltage | | 2.2-3.3VDC (internal battery on activity meter) |
| Hardware version | | See Annex 1 |

Test object 2.1.1

| | | | |
|---------------------|--|-----|------------|
| Name of test object | AM2 (3 pieces) | | |
| Model / type | 418MHz | | |
| Part no. | 86295081 | | |
| Serial no. | 0x70707A | Ch2 | 417.99 MHz |
| | 0x70707B | Ch0 | 417.33 MHz |
| | 0x70707C | Ch1 | 417.66 MHz |
| Comment | Used during measurement of Radiated spurious emission. | | |
| Received | Date: 2013-06-04 Status: Prototype | | |

Test object 2.1.2

| | |
|---------------------|---|
| Name of test object | AM2 |
| Model / type | 418MHz |
| Part no. | 86295081 |
| Serial no. | 2347 For reference, TX level 3, 417.99 MHz 2472 For reference, TX level 4, 417.66 MHz 2032 Test object, TX level 5, 417.33 MHz |
| Comment | Used during measurement of peak output field strength |
| Received | Date: 2014-06-19 Status: Prototype |

Radio parameters.

| | |
|--------------------------|-------------------------|
| Operating frequency | 417.0 – 418.8 MHz |
| Number of channels | 4 |
| Channel spacing: | 330 kHz |
| Duty cycle | 0.06% |
| Bit rate and Modulation | 20 kbps GFSK |
| Ambient temperature low | -25° C |
| Ambient temperature high | +55° C |
| Power supply | 2.2 - 3.3 VDC |
| Antenna type | Integral antenna on PCB |

Above information is declared by the manufacturer.

For the radio parameter tests a number of Tx radio modules where used with different configuration of interface, modulation and send/ receive mode as listed in Annex 1.

2.2 Auxiliary equipment

Auxiliary equipment 2.2.1

| | |
|-----------------------------|--|
| Name of auxiliary equipment | 230VAC/ 12VAC transformer |
| Model / type | 115VAC/230VAC to 12VAC transformer SP60 |
| Part no. | SP21106 |
| Serial no. | - |
| Manufacturer | Transformator Teknik. |
| Supply voltage | 115VAC/230VAC |
| Comment | Auxiliary equipment supplied by the client, who also has the responsibility for its correct function and set up. |

Auxiliary equipment 2.2.2

| | |
|-----------------------------|--|
| Name of auxiliary equipment | System controller |
| Model / type | SC |
| Part no. | 942982-81 |
| Serial no. | XA41571 |
| Manufacturer | DeLaval International AB |
| Supply voltage | |
| Comment | Auxiliary equipment supplied by the client, who also has the responsibility for its correct function and set up. |

Auxiliary equipment 2.2.3

| | |
|-----------------------------|--|
| Name of auxiliary equipment | RFID reader |
| Model / type | Multirod reader |
| Part no. | 946480-80 |
| Serial no. | ZJ080194FX |
| Manufacturer | DeLaval International AB |
| Supply voltage | - |
| Comment | Auxiliary equipment supplied by the client, who also has the responsibility for its correct function and set up. |

Auxiliary equipment 2.2.4

| | |
|-----------------------------|--|
| Name of auxiliary equipment | MPC |
| Model / type | MPC680 |
| Part no. | 928500-83 |
| Serial no. | ZD213247 |
| Manufacturer | DeLaval International AB |
| Supply voltage | 12 VAC |
| Comment | Auxiliary equipment supplied by the client, who also has the responsibility for its correct function and set up. |

Auxiliary equipment 2.2.5

| | |
|-----------------------------|--|
| Name of auxiliary equipment | Laptop PC |
| Model / type | Different PCs have been used. 14-06-18: Dell Latitude E5440 |
| Part no. | - |
| Serial no. | - |
| Manufacturer | |
| Supply voltage | 230 VAC |
| Comment | Auxiliary equipment supplied by the client, who also has the responsibility for its correct function and set up. |

Auxiliary equipment 2.2.6

| | |
|---------------------|------------------------------------|
| Name of test object | AR2 |
| Model / type | 418MHz |
| Part no. | 86120691 |
| Serial no. | RFI2 85821791 |
| Comment | 4B |
| Received | Set to 15 transmissions/ s |
| | Date: 2013-06-04 Status: Prototype |

Auxiliary equipment 2.2.7

| | |
|---------------------|---|
| Name of test object | AR2 |
| Model / type | 418MHz |
| Part no. | 86120691 |
| Serial no. | RFI2 85821791 |
| Comment | Antenna part no 86121231 |
| Received | CE130245FX |
| | Set to continuous transmission at TX level 1 with 10 dB attenuator enabled. |
| | Used during peak output field strength measurement. |
| | Date: 2014-06-19 Status: Prototype |



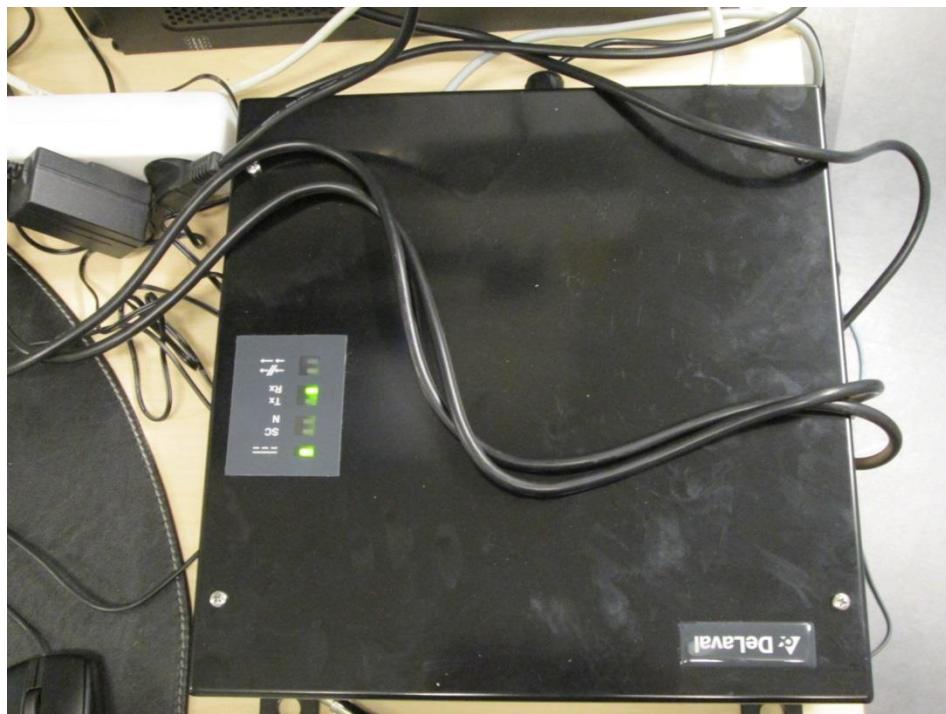


Photo 2.2.1 Auxiliary equipment **2.2.2.** System controller



Photo 2.2.2 Auxiliary equipment **2.2.5**, PC and **2.2.2**, system controller.



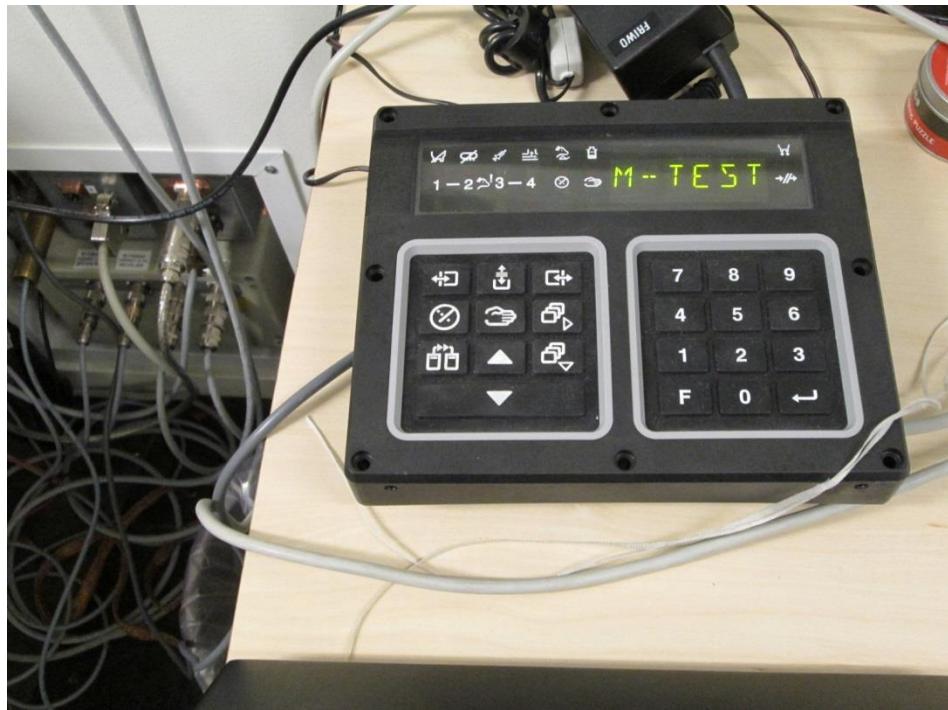


Photo 2.2.3 Auxiliary equipment.2.2.4.2.2.4



Photo 2.2.4 Auxiliary equipment. RFID reader.2.2.3.





Photo 2.2.5 Auxiliary equipment 2.2.7. **A**ctivity **R**eceiver (AR)

3. General test conditions

3.1 Test setup during test

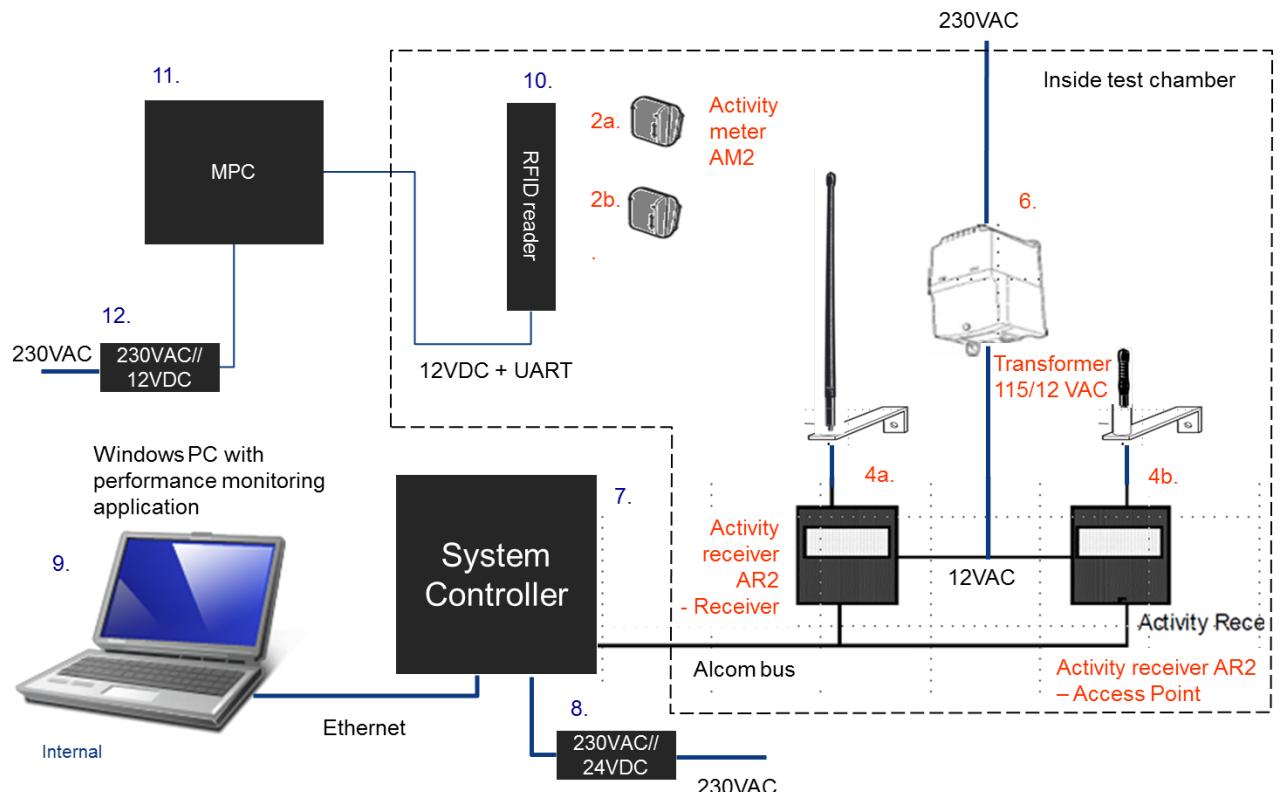


Figure 3.1.1 Block diagram of test object(s) with cables and auxiliary equipment.

3.2 Description and intended use of test object

The Activity meter is a part of the Activity Meter System, an electronic, heat-detection system for cows and heifers in heat.

The activity meter is battery driven. The battery has a lifetime of approximately 10 years.

Each activity meter has a unique serial number.

The activity meter must be placed on the cow's neckband at least five days before a heat cycle begins.

Delaval recommends that the activity meter then stays permanently mounted on the cow.

3.2.1 Operation mode

The Activity Meter can be in one of two different modes, ON or OFF.

3.2.1.1 ON mode

When the Activity meter is in ON mode, it works normally, i.e. it measures activity and sends the data through the RF link every hour.

To put the Activity meter in ON mode, expose it to the magnetic field of an RFID reader.

(I.e. pass through a DeLaval Multireader, Portal reader, VMS, Sort Gate...)

For cows that will not pass an RFID reader regularly (I e. non-milking cows), the Meters will have to be started manually before mounted on the cow, or by using a Handheld RFID reader.

To confirm that it has gone to ON mode, the Activity Meter sends a special radio message. Thereafter it will send every hour.

3.2.1.2 OFF mode

When the Activity meter is in OFF mode, it is not working, i.e. it does not measure any activity and there will be no RF transmissions.

To put the Activity meter in OFF mode, let it rest for at least 48 hours. It will automatically turn OFF if no movement has been detected for 48 hours.

Note: Any movement will trigger a new 48 hour countdown period.

To confirm that it has gone to OFF mode, the Activity Meter sends a last radio message indicating OFF status.

3.2.2 Test modes during emission tests

Normal operation. Continuous communication is established between the devices.

3.3 Modifications of the test object

No modifications were incorporated.

3.4 Test sequence

The tests described in this test report were performed in the following sequence:

1. Measurement of radio frequency voltage on mains
2. Measurement unwanted emissions in the spurious domain
3. Radio parameter tests

4. Test results

4.1 Measurement of radiated spurious emission.

| | | | |
|---------------|---|-------------|--------------|
| Test object | Combination of 2.1.2: AM2 (3 pieces) Auxiliary equipment 2.2.6: AR2 | Sheet | RE-1 |
| Type | See section 2 | Project no. | E703572 |
| Serial no. | See section 2 | Date | 07 June 2013 |
| Client | DeLaval International AB | Initials | LAJ |
| Specification | FCC:47 CFR Part 15, subpart C | Frequency | 30-1000 MHz |

Parameters for 30 – 1000 MHz test

| | | | |
|-----------------|---------------------------------------|-------------|---------|
| Test method | ANSI C63:4:2009 | Temperature | 21 °C |
| Characteristics | Complete search, Antenna distance 3 m | Humidity | 41 % RH |
| Detector | Peak and quasi peak | Bandwidth | 120 kHz |
| Test equipm. | EMC Hall A Västerås Setup VEC1 | Uncertainty | 6.2 dB |

Parameters for 1 – 4,5 GHz test

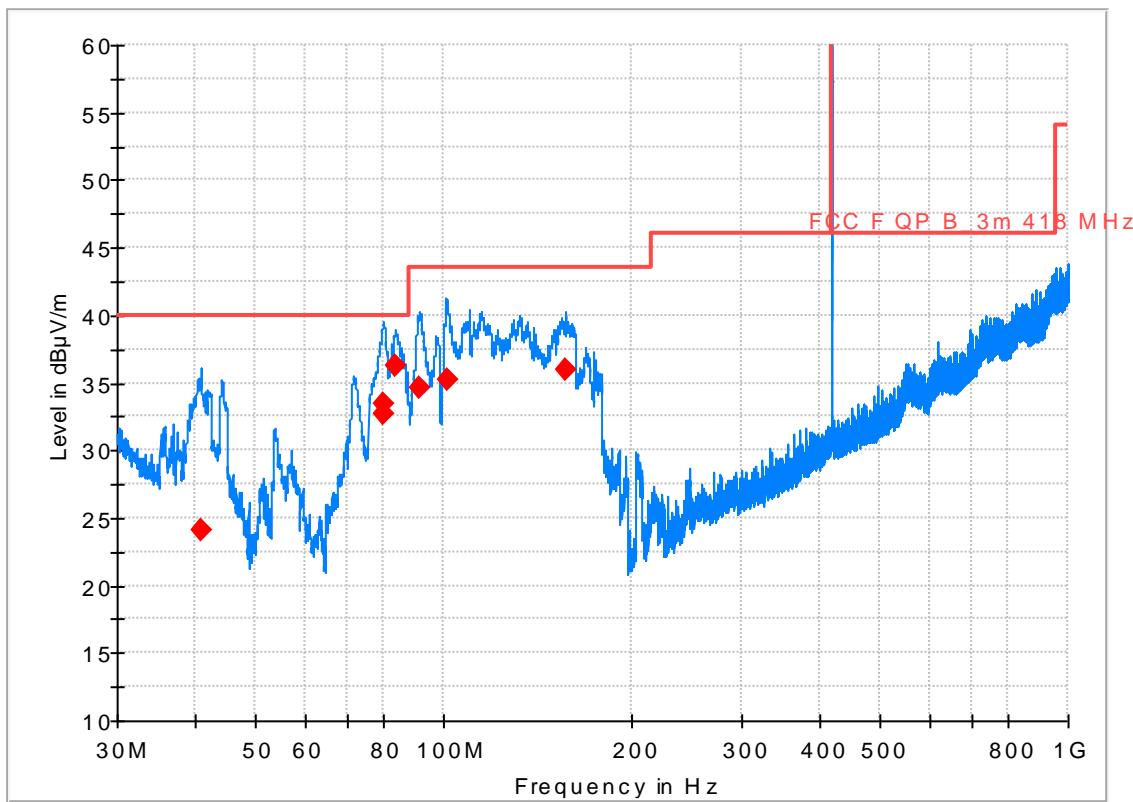
| | | | |
|-----------------|---------------------------------------|-------------|---------|
| Test method | ANSI C63:4:2009 | Temperature | 21 °C |
| Characteristics | Complete search, Antenna distance 3 m | Humidity | 41 % RH |
| Detector | Peak, quasi peak and Average | Bandwidth | 1 MHz |
| Test equipm. | EMC Hall A Västerås Setup VEC1 | Uncertainty | 4.5 dB |

| | |
|-------------|---|
| Test result | The measured field strengths are below the limit |
| Compliant | Yes |
| Comments | Final maximal measurements by variation of turntable azimuth, antenna height, and antenna polarisation. Measurement performed with transmitters continuously in Tx mode. |
| | The test object is set to operate on the lowest operating channel (ch 0) and Auxiliary Equipment 2.2.6 on the highest operating channel (ch 3). |

Radiated Spurious Emission Test

Test Description: Radiated emission. Complete measurement 30 - 1000 MHz
Date: 2013-06-24
EUT Name: Activity receiver Tx. Activity meter Tx
Manufacturer: DeLaval
Serial Number: Activity receiver: 4.B, Activity meters: 0x70707A, 0x70707B,
Operating Conditions: 115 VAC, 60 Hz
Test Site: DELTA Development Technology AB
Operator Name: Lars J
Test Specification: FCC CFR 47, Part 15, Subpart C.
Comment:

Full Spectrum



Preview Result 1-PK+ FCC F QP B_3m 418 MHz◆ QuasiPeak-QPK

Final Result

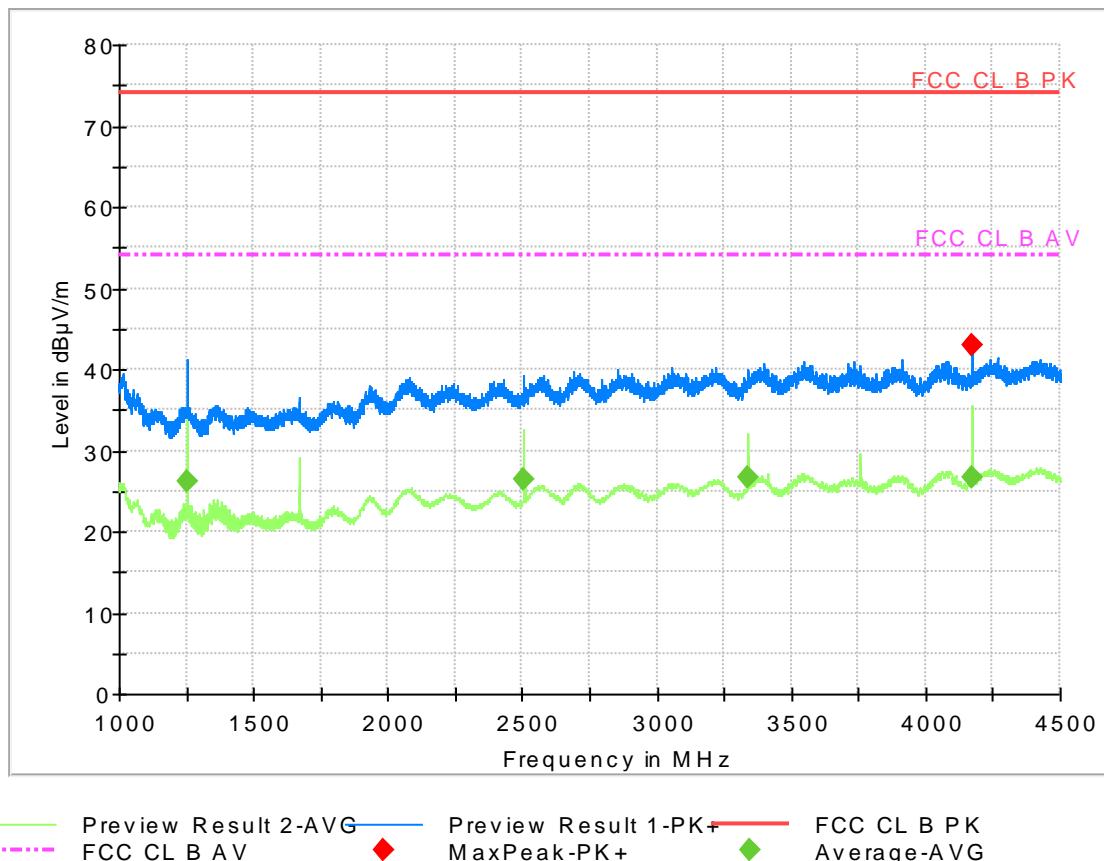
| Frequency (MHz) | QuasiPeak (dB μ V/m) | Limit (dB μ V/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|--------------------------|----------------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 40.920000 | 24.15 | 40.00 | 15.85 | 1500.0 | 120.000 | 121.0 | V | 74.0 | 14.7 |
| 79.920000 | 32.73 | 40.00 | 7.27 | 1500.0 | 120.000 | 111.0 | V | 284.0 | 9.6 |
| 80.220000 | 33.39 | 40.00 | 6.61 | 1500.0 | 120.000 | 150.0 | V | 69.0 | 9.6 |
| 83.880000 | 36.19 | 40.00 | 3.81 | 1500.0 | 120.000 | 125.0 | V | 83.0 | 10.3 |
| 91.710000 | 34.57 | 43.50 | 8.93 | 1500.0 | 120.000 | 105.0 | V | 252.0 | 11.4 |
| 101.250000 | 35.22 | 43.50 | 8.28 | 1500.0 | 120.000 | 280.0 | H | 31.0 | 12.6 |
| 156.780000 | 35.99 | 43.50 | 7.51 | 1500.0 | 120.000 | 181.0 | H | 77.0 | 13.4 |



Radiated Spurious Emission Test

Test Description: Radiated emission Complete measurement 1-4,5 GHz
 Date: 2013-06-25
 EUT Name: Activity receiver Tx. Activity meter (Tag) Tx
 Manufacturer: DeLaval
 Serial Number:
 Operating Conditions: 115 VAC, 60 Hz
 Test Site: DELTA Development Technology AB
 Operator Name: Lars J
 Test Specification: FCC CFR 47, Part 15, subpart C
 Comment:

Full Spectrum



Final Result

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 1252.000000 | --- | 26.23 | 54.00 | 27.77 | 1500.0 | 1000.000 | 100.0 | H | 105.0 | -16.0 |
| 2503.750000 | --- | 26.50 | 54.00 | 27.50 | 1500.0 | 1000.000 | 111.0 | V | 236.0 | -11.0 |
| 3338.250000 | --- | 26.71 | 54.00 | 27.29 | 1500.0 | 1000.000 | 106.0 | V | 281.0 | -8.1 |
| 4173.500000 | 42.93 | --- | 74.00 | 31.07 | 1500.0 | 1000.000 | 120.0 | V | 330.0 | -7.4 |
| 4174.000000 | --- | 26.59 | 54.00 | 27.41 | 1500.0 | 1000.000 | 130.0 | V | 336.0 | -7.4 |

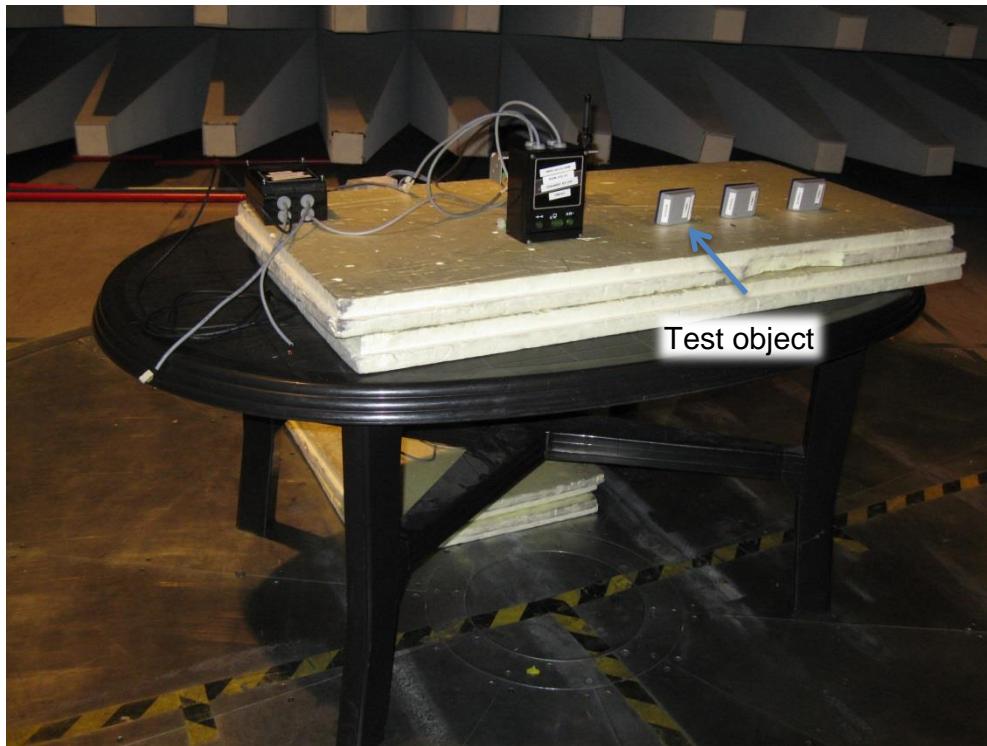


Photo 4.1.1 Test setup regarding measurement of radio frequency electromagnetic field.

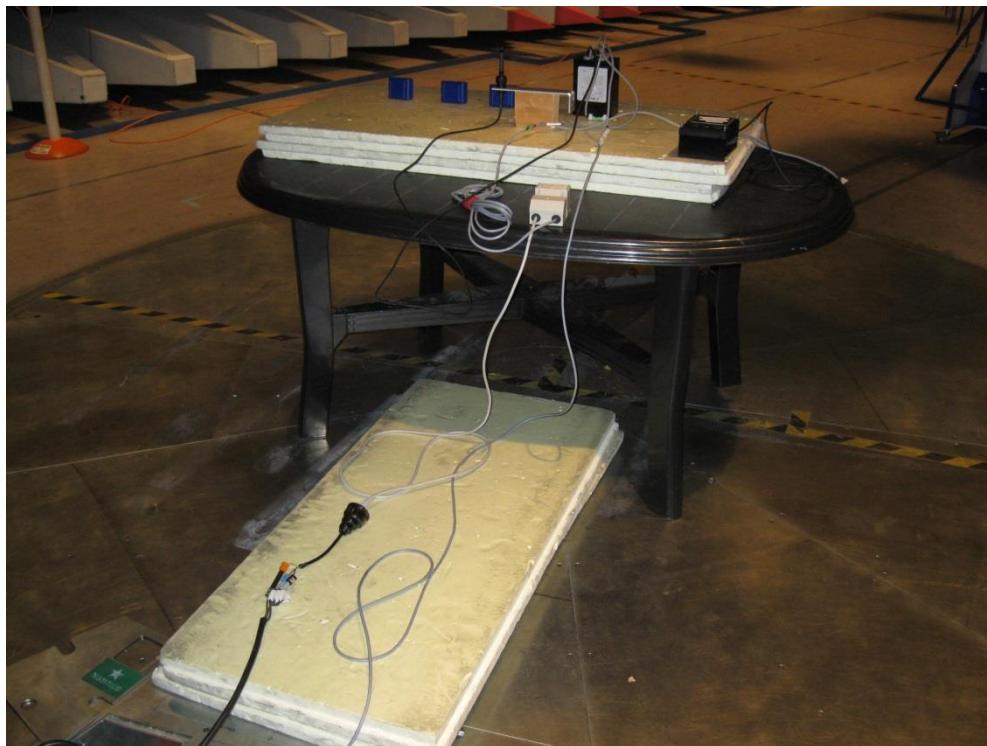


Photo 4.1.2 Test setup regarding measurement of radio frequency electromagnetic field.

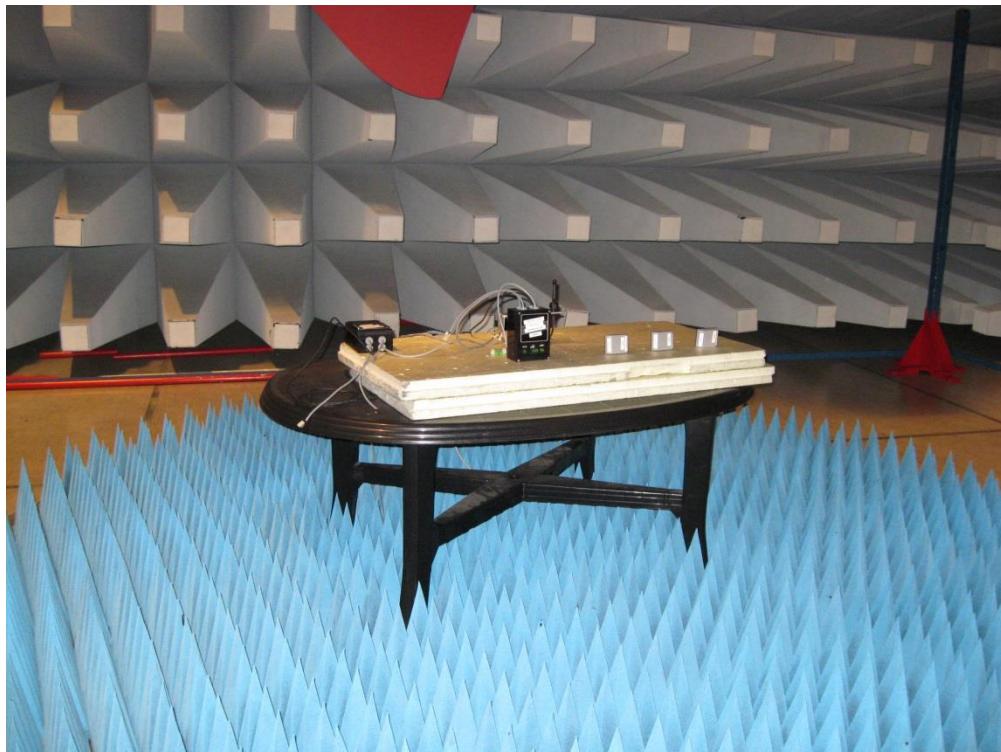


Photo 4.1.3 Test setup regarding measurement of radio frequency electromagnetic field > 1 GHz

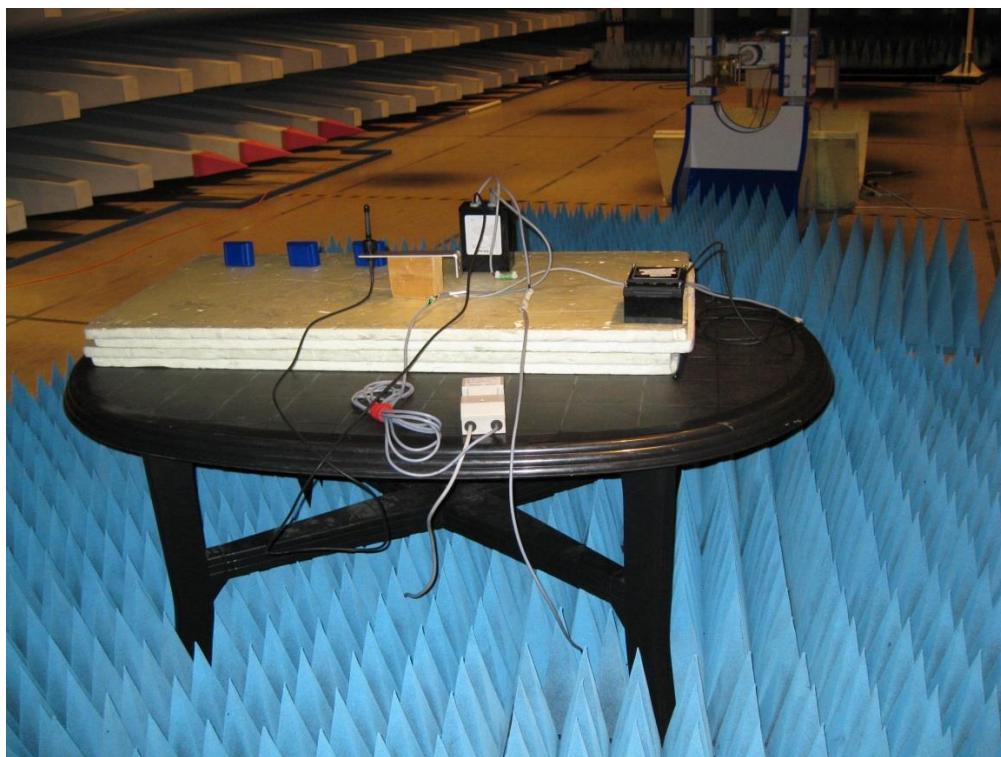


Photo 4.1.4 Test setup regarding measurement of radio frequency electromagnetic field > 1 GHz

4.2 Measurement of peak output field strength of fundamental

| Test object | Combination of Test object 2.1.3 and auxiliary equipment 2.2.7 | | | | Sheet | RE_Spur-1 | | | |
|--|---|--|---------------------------|---|--|--------------|---------|--|--|
| Type | See section 2 | | | | Project no. | E703572 | | | |
| Serial no. | See section 2 | | | | Date | 19 June 2014 | | | |
| Client | DeLaval International AB | | | | Initials | LAJ | | | |
| Specification | FCC Part 15, Subpart C, Section 15.231 | | | | Uncertainty | 1.8 dB | | | |
| Test method | ANSI C63.4:2009 | | | | Temperature | 22 °C | | | |
| Characteristics | Complete search, Antenna distance 3 m. | | | | Humidity | 27 % RH | | | |
| Test equipm. | EMC Hall A Västerås Setup VEC1 | | | | | | | | |
| SA Settings | RBW: 120 kHz DET: Average/ Peak Trace: Max hold | | | | | | | | |
| EUT | Frequency [MHz] | Average measurement [dB μ V/m] | DCCF (δ) [dB] | Corrected average measurement [dB μ V/m] | Average limit [dB μ V/ m] | Passed | Remarks | | |
| Activity meter | 417.33 | 87.8 | - 9.0 | 78.8 | 80.3 | Yes | Note 1 | | |
| Activity receiver | 418.32 | 82.0 | -6 | 76 | 80.3 | Yes | Note 2 | | |
| Note 1: Activity meter measured with peak detector. Lowest channel measured. | | | | | | | | | |
| Note 2: Measurement on highest channel in band. Measured on AE 2.2.7 | | | | | | | | | |

| | |
|----------------|---|
| Test result | The measured average field strengths corrected with the DCCF (δ) are below the average limit Corrected average: PAverage(resulting) = Ppeak + DCCF (δ). |
| Test Port | Enclosure |
| Test frequency | 417.33 MHz |
| Test mode | Continuous Tx with modulation. |
| Condition | Normal |
| Compliant | Yes |
| Comments | Final maximal measurements by variation of turntable azimuth, antenna height and antenna polarization. The test object is set to operate on the lowest operating channel (ch 0) and Auxiliary Equipment 2.2.7 on the highest operating channel (ch 3). |

The limit for maximum radiated field strength at the fundamental frequency is given in 15.231b and calculated as $41.6667(F) - 7083.3333$, where F is the frequency in MHz.

Limit at 417.3 MHz = $10.304 \mu\text{V/m} = 80.3 \text{ dB}\mu\text{V/m}$

Limit at 418.3 MHz = $10.346 \mu\text{V/m} = 80.3 \text{ dB}\mu\text{V/m}$.

The duty cycle correction factor (δ) can be applied to the peak pulse amplitude to find the average emission. This is valid for one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds.

The duty cycle correction factor for the **activity meter** is determined as follows:

The value for the duty cycle (D) is:

Max. Tx on time: 35.6 ms

Period: 100 ms.

The calculated duty cycle expressed in % is:

$D(\%) = ((\text{Max. Tx on time}) \mu\text{s} / (\text{period}) \mu\text{s}) \cdot 100\% = 35.6\%$.

The calculated duty cycle correction factor expressed in dB is:

$\delta(\text{dB}) = 20 \log (\text{Max. Tx on time} (\mu\text{s}) / \text{period} (\mu\text{s})) = -8.97 \text{ dB}$.

The duty cycle correction factor for the **activity receiver** is determined as follows:

The value for the duty cycle (D) is:

Max. Tx on time: 35.6 ms

Period: 72 ms

The calculated duty cycle expressed in % is:

$D(\%) = ((\text{Max. Tx on time}) \mu\text{s} / (\text{period}) \mu\text{s}) \cdot 100\% = 50\%$.

The calculated duty cycle correction factor expressed in dB is:

$\delta(\text{dB}) = 20 \log (\text{Max. Tx on time} (\mu\text{s}) / \text{period} (\mu\text{s})) = -6 \text{ dB}$.

According to ANSI C63.10.2009 (section 4.2.3.2.4), FCC CFR 47 Part 15 Subpart C (Section 15.35(c)) and RSS-Gen (section 6.10) this correction factor can be applied for all emissions including the fundamental and harmonics above 1 GHz.

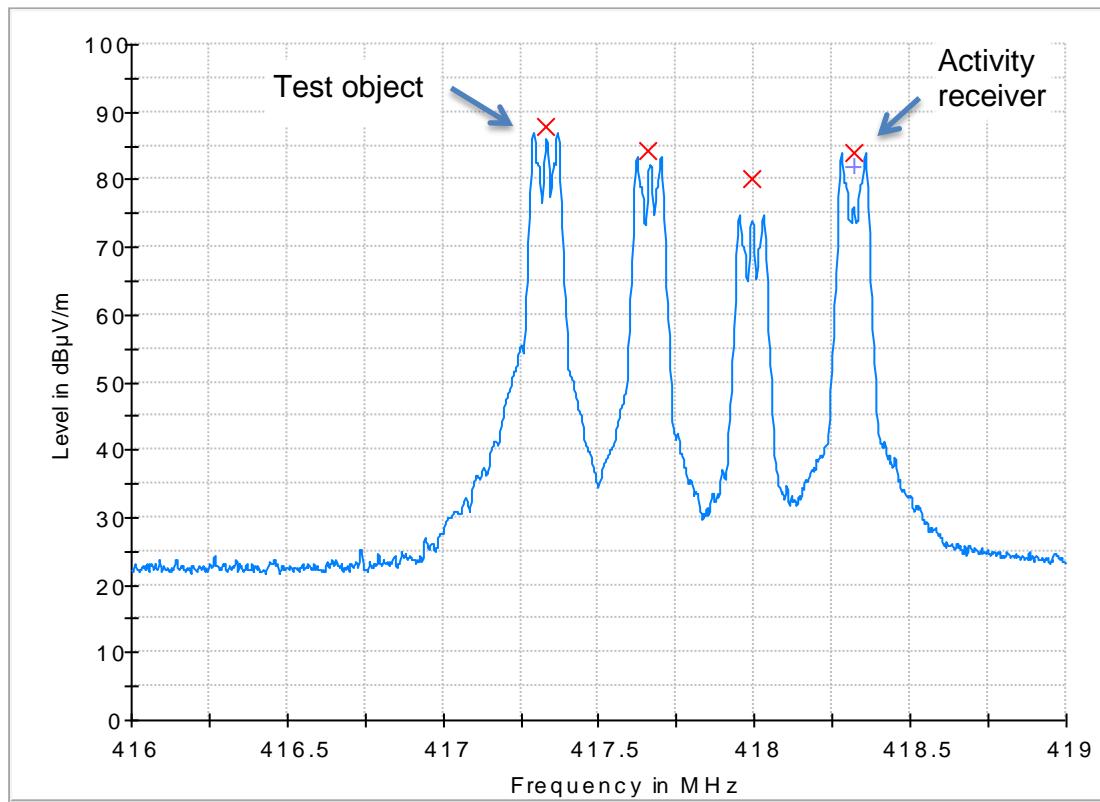
The corrected average is: $\text{PAverage(resulting)} = \text{Ppeak} + \text{DCCF}(\delta)$.



Measurement of peak output field strength of fundamental

Test Description: Radiated emission scan 30 - 1000 MHz
 Date: 2014-06-19
 EUT Name: Activity meter system
 Manufacturer: DeLaval International AB
 Serial Number: See Test object 2.1.2 and Auxiliary equipment 2.2.7
 Antenna: Various heights/ polarizations
 Turntable: 0 - 360 deg
 Test Site: DELTA Development Technology AB
 Operator Name: Lars J
 Test Specification: FCC Part 15, Subpart C,
 Comment: Activity receiver 418.32 MHz Pow lev 1 with activated attenuator.
 Activity meter at 417.33 MHz with power level 5 is the actual test object.
 Activity meter at 417.66 MHz, Pow lev 4, and at 417.99 MHz, pow level 3 are present of investigational purposes.

RE 30M-1GHz utan HP 3m Fast prescan CBL6111A



Result Table_Single

| Frequency (MHz) | MaxPeak (dB μ V/m) | Average (dB μ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|------------------------|------------------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 417.330000 | 87.8 | --- | 1500.0 | 120.000 | 120.0 | V | 0.0 | 20.7 |
| 417.660000 | 84.4 | --- | 1500.0 | 120.000 | 120.0 | V | 21.0 | 20.7 |
| 417.990000 | 80.2 | --- | 1500.0 | 120.000 | 120.0 | V | 172.0 | 20.7 |
| 418.320000 | 83.9 | 82.0 | 1500.0 | 120.000 | 100.0 | V | 0.0 | 20.7 |

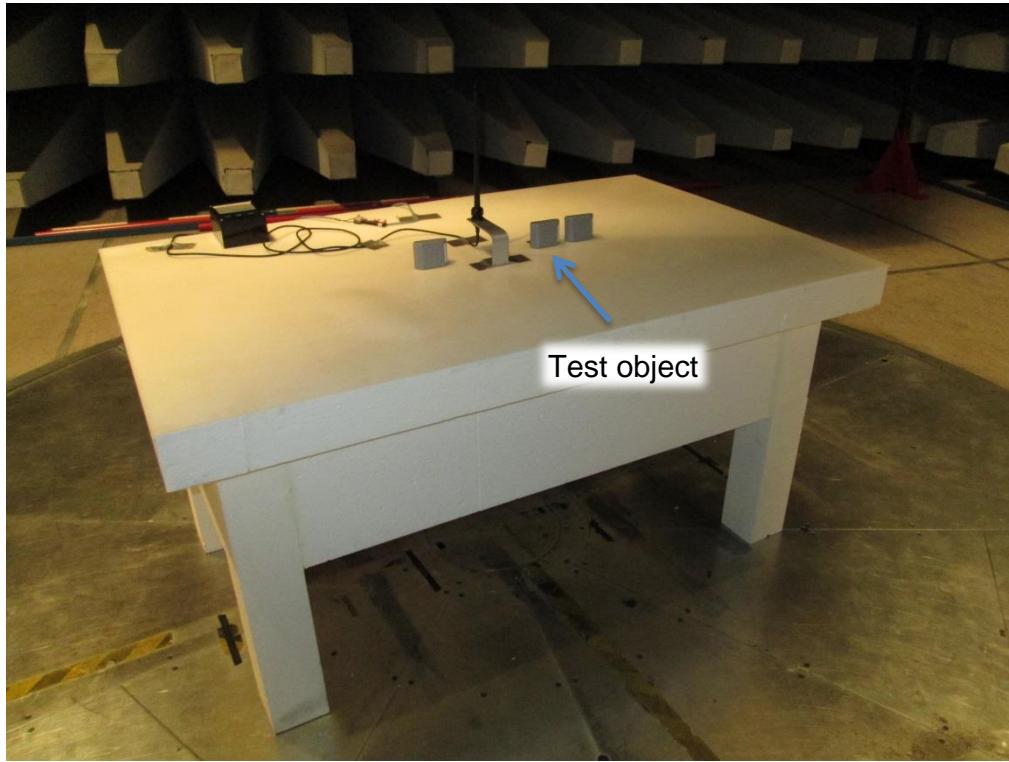


Photo 0.1 Test setup regarding measurement of peak output field strength of fundamental.

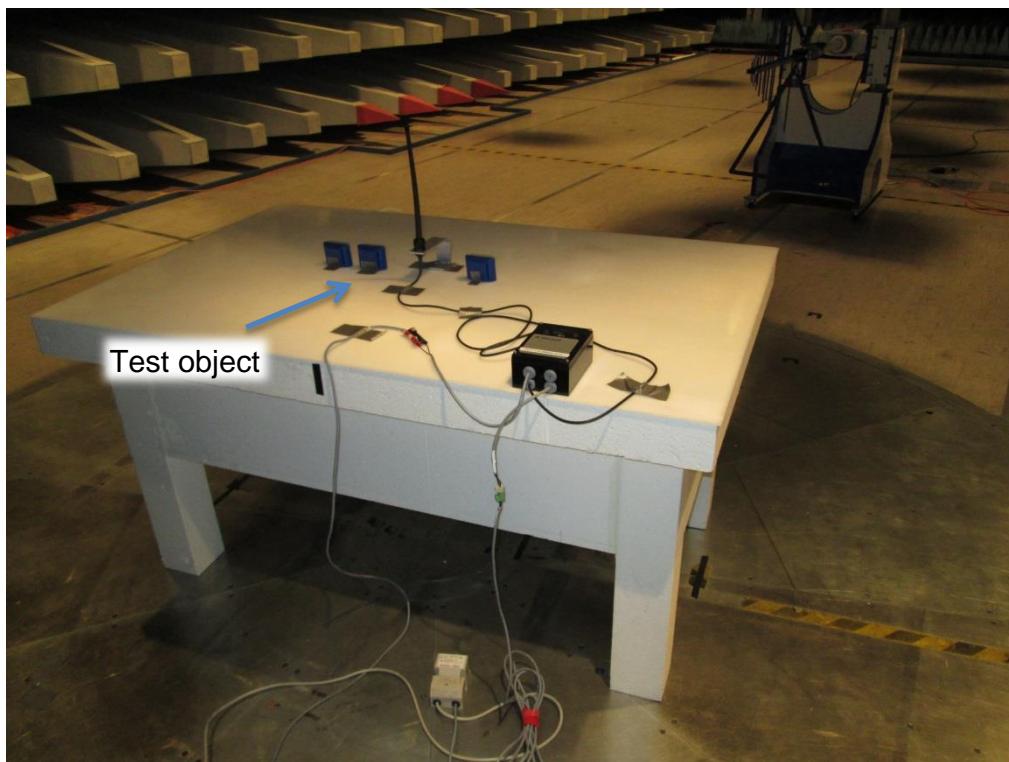


Photo 0.2 Test setup regarding measurement of peak output field strength of fundamental.



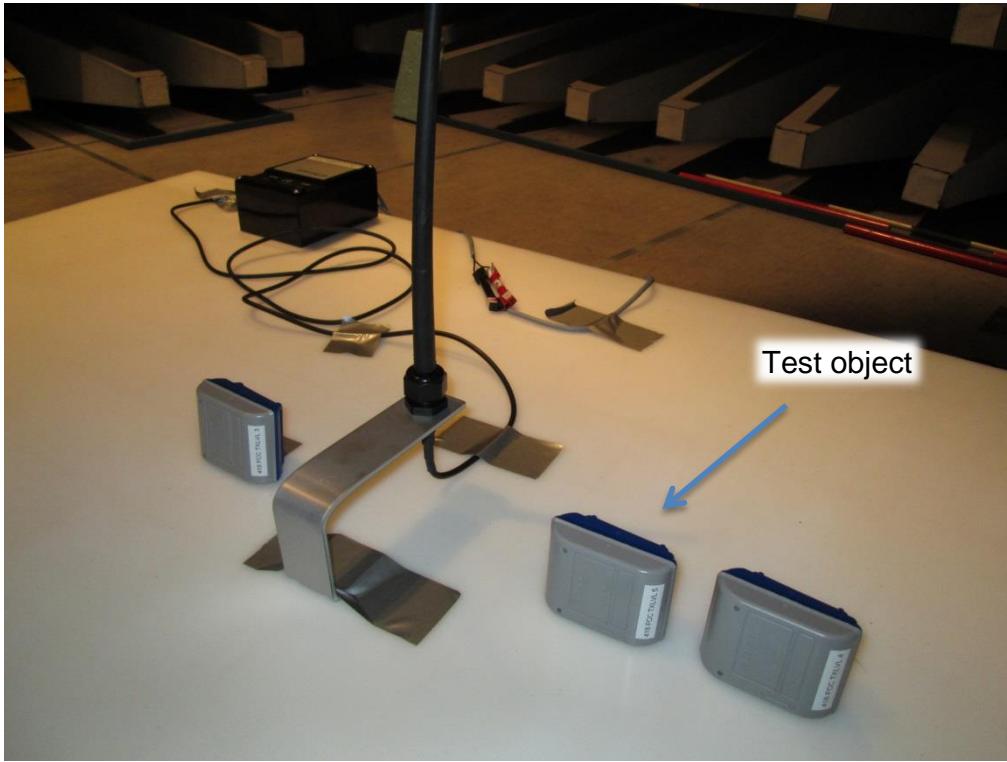


Photo 0.3 Test setup regarding measurement of peak output field strength of fundamental.

4.3 Measurement of occupied bandwidth

| Test object | Combination of 2.1.1: AM2 Auxiliary equipment 2.2.6: AR2 | Sheet | ADJ_PWR-1 | |
|--|--|--------------------|--------------|---------|
| Type | See section 2 | Project no. | E703572 | |
| Serial no. | See section 2 | Date | 24 June 2013 | |
| Client | DeLaval International AB | Initials | LAJ | |
| Specification | FCC Part 15, Subpart C, Section 15.231 C | | | |
| Test method | ANSI C63.4:2009 | Temperature | 23 °C | |
| Characteristics | -20 dBc | Humidity | 27 % RH | |
| Test equipm. | EMC Hall A Västerås Setup VEC1 | | | |
| SA Settings | RBW: 120 kHz DET: Peak Trace: Max hold | | | |
| Frequency [MHz] | Occupied bandwidth | Limit (0.25% x Cf) | Passed | Remarks |
| 417.33 | 320 kHz | 1.05 MHz | Yes | Note 1 |
| 418.32 | 310 kHz | 1.05 MHz | Yes | Note 2 |
| Note 1: Lowest channel measured. | | | | |
| Note 2: Measurement on highest channel in band. Measured on AE 2.2.7 | | | | |

RE 30M-1GHz utan HP 3m Fast prescan CBL6111A

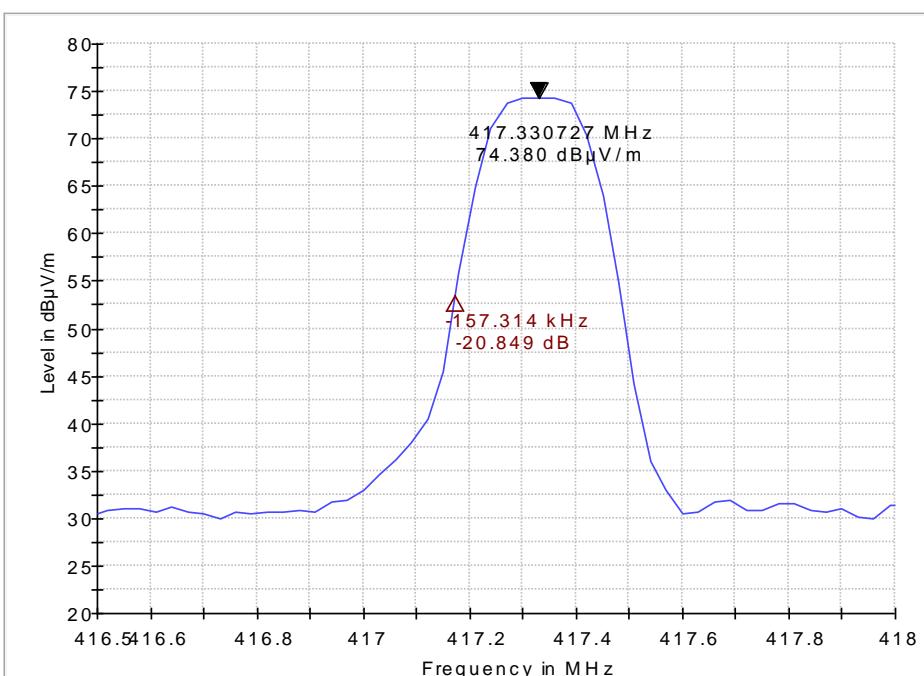


Figure 1 20 dB Bandwidth of the modulated carrier from activity meter.

RE 30M-1GHz utan HP 3m Fast prescan CBL6111A

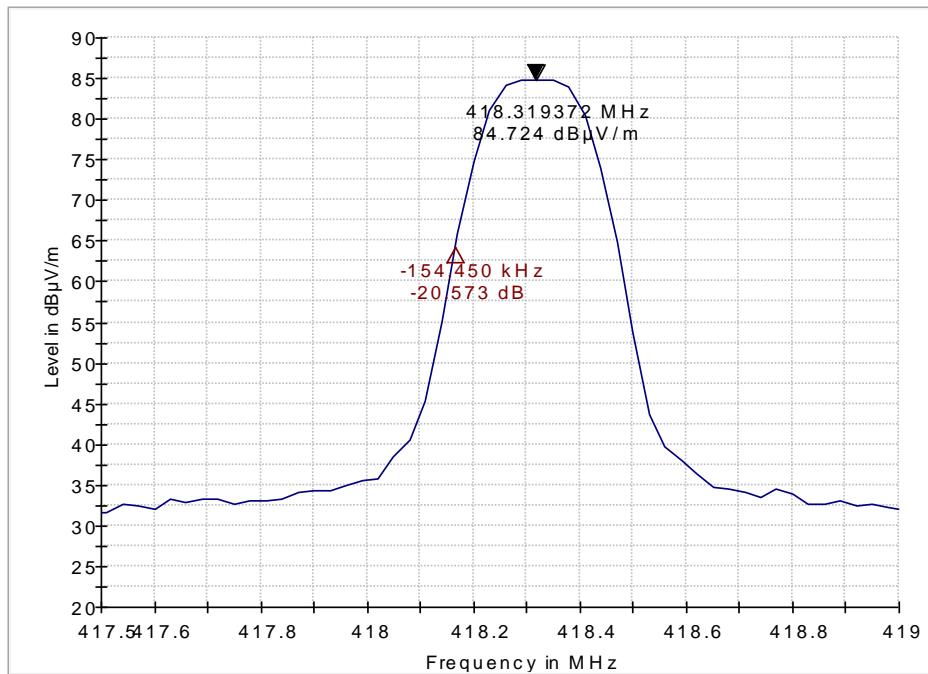


Figure 2 20 dB Bandwidth of the modulated carrier from the activity receiver.

| | |
|-----------------|--|
| Test result | The measured 20 dB bandwidths from activity meter was within the limits |
| Test modulation | Normal modulation. |
| Compliant | Yes |
| Comments | <p>The occupied bandwidth is channel independent.</p> <p>The test object is set to operate on the lowest operating channel (ch 0) and Auxiliary Equipment 2.2.6 on the highest operating channel (ch 3).</p> |

4.4 Periodic operation

The device is transmitting 4 times per hour in average, where the actual transmission time is randomized*.

The maximum TX data packet length** is 35,6 ms.

The nominal TX duty cycle generated is 4x35,5 ms=142 ms per hour (0,004% duty).

Footnotes:

* 0-1 s (corresponding to 28-75 data packets).

** The system supports variable data packet length.

| Requirements | Requirements | Verdict |
|---|---|---|
| RSS-210 – clause A1.1.1 | FCC CFR 47, Part 15, Subpart C clause 15.231a | |
| a).A manually operated transmitter ... | (1) A manually operated transmitter ... | Complies Not applicable since the device is not manually operated |
| b).A transmitter activated automatically shall cease transmission within 5 seconds after activation | (2) A transmitter activated automatically shall cease transmission within 5 seconds after activation | Complies since the maximum TX data packet length is 35,6 ms i.e. transmission will cease within <<5 seconds |
| c) Periodic transmissions at regular predetermined intervals are not permitted | 3) Periodic transmissions at regular predetermined intervals are not permitted. | Complies since the device transmission time is randomized and additionally the transmission time is limit to max 142 ms per h |
| d).Intentional radiators employed for radio control purposes during emergencies | (4) Intentional radiators which are employed for radio control purposes during emergencies | Complies Not applicable since the device is not for radio control purposes |
| | (5) Transmission of set-up information for security systems may exceed the transmission duration limits in paragraphs (a)(1) and (a)(2) of this section | Complies Not applicable since the device do not transmit set-up information .. |

5. National registrations and accreditations

5.1 SWEDAC Accreditation

Organization: Swedish Board for Accreditation and Conformity Assessment - SWEDAC, see www.swedac.se and www.ilac.org

Registration Number: 1688

SWEDAC is part of ILAC (International Laboratory Accreditation Cooperation) including its MRA (Mutual Recognition Arrangement).

5.2 FCC Registrations

Organization: Federal Communications Commission, USA

Registration Number: 516880

Facilities: EMC chamber A 3 and 10 m

5.3 IC Registrations

Organization: Industry Canada, Certification and Engineering Bureau

Registration Number: 9347A

Facilities: EMC chamber A (9347A-1)

6. List of instruments

| Setup VEA1 | | | | | | | |
|---|---------|-------------------------|-----------------|-------------------|--------------------------|--------------------------|-------------------|
| Measurement of radio frequency voltage on mains | | | | | | | |
| Used | ID no. | Description | Manufacturer | Type no. | Cal Date | Due Date | Setup uncertainty |
| <input checked="" type="checkbox"/> | 36070 | Software | Rohde & Schwarz | EMC32 ver. 9.0.10 | - | - | 1.8 dB |
| <input checked="" type="checkbox"/> | 36020 | Measuring receiver | Rohde & Schwarz | ESU26 | 27/09/2012 07/08/2013 | 27/09/2013 07/08/2014 | |
| <input checked="" type="checkbox"/> | IE-B919 | LISN 2 x 10 A 250 V | Rohde & Schwarz | ESH3-Z5 | 15/08/2012 06/08/2013 | 15/08/2013 06/08/2014 | |
| <input checked="" type="checkbox"/> | 36062 | Impulse Voltage Limiter | Rohde & Schwarz | ESH3-Z2 | 01/10/2012 21/06/2013 | 01/10/2013 21/06/2014 | |

| Setup VEC1 | | | | | | | |
|--|---------|-----------------------|-----------------|-------------------|--|--|---|
| Measurement of radio frequency electromagnetic field | | | | | | | |
| Used | ID no. | Description | Manufacturer | Type no. | Cal Date | Due Date | Setup uncertainty |
| <input checked="" type="checkbox"/> | 36070 | Software | Rohde & Schwarz | EMC32 ver. 9.0.10 | - | - | 5.1 dB 30-1000 MHz (10 m) 6.2 dB 30-1000 MHz (3 m) 4.5 dB 1-6 GHz (3 m) Power measurement 5.0 dB 30 MHz-12.75 GHz |
| <input checked="" type="checkbox"/> | 36020 | Measuring receiver | Rohde & Schwarz | ESU26 | 27/09/2012 07/08/2013 | 27/09/2013 07/08/2014 | |
| <input checked="" type="checkbox"/> | IE-B928 | Antenna Bilog | Chase | CBL6111A | 28/08/2011 31/07/2013 | 28/08/2013 31/07/2015 | |
| <input checked="" type="checkbox"/> | E-I839 | Antenna Horn 18GHz | ARA | DRG-118/A | 26/07/2011 30/07/2013 | 26/07/2013 30/07/2015 | |
| <input checked="" type="checkbox"/> | IE-B758 | Preamplifier | HP | 8447F | 16/08/2012 08/08/2013 07/08/2014 | 16/08/2013 08/08/2014 07/08/2015 | |
| <input checked="" type="checkbox"/> | 35122 | Attenuator 10 dB | Mini-Circuits | NAT-10 1W, N | 22/08/2012 01/10/2013 | 22/08/2013 01/10/2014 | |
| <input checked="" type="checkbox"/> | 36066 | Highpass filter 1 GHz | Micro-Tronics | HPM 15119 | 21/11/2012 21/11/2013 | 21/11/2013 21/11/2014 | |
| <input checked="" type="checkbox"/> | 36021 | Preamplifier | Quinstar | QLJ-01184040-J0 | 21/11/2012 | 21/11/2013 | |
| <input checked="" type="checkbox"/> | 36022 | Power supply | DELTA | UVB | - | - | |
| <input checked="" type="checkbox"/> | 36071 | Controller | Maturo | NCD | - | - | |
| <input checked="" type="checkbox"/> | 36072 | Tilt antenna mast | Maturo | TAM 4.0-E | - | - | |
| <input checked="" type="checkbox"/> | | Turntable | Heinrich Deisel | DT 440 | - | - | |

7. Revision

| Rev. index | Description | Date/ Init |
|------------|---|----------------------|
| - | New document | 15 July 2014/ LAJ |
| A | Section 2.1; Insertion of separate FCC and IC numbers. Clarification of system units. | 03 Nov. 2014/ LAJ |
| B | Test object AR2 removed from report. Section 4.4 added. Calibration date added to instrument list | 28 January 2015/LAJ |
| C | Section 4.5 Periodic operation. verdict clarified | 06 February 2015/ULB |

Annex 1

Device list from DeLaval International AB.



| Test | # | ID | Product name | short Product art | no Accessories | PBA art, version | | HW modifications | | SW modifications | | Prod config | | RMW config | | Indiv config | |
|--------------------------|-----|----------|--------------|-------------------|----------------|----------------------------|------------|--------------------|------|--------------------|--------------|--------------------|-------------------|--------------------|--------------|--------------------|----------------------|
| | | | | | | none | none | RF Pwr=111 +13 dBm | 4 ch | RF Pwr=101 +7 dBm | 4 ch | RF Pwr=101 +7 dBm | 4 ch | RF Pwr=101 +7 dBm | 4 ch | RF Pwr=101 +7 dBm | 4 ch |
| ESD | 1a. | EDEB1A | AM2 433MHz | 862965082/3 | | | | | | | | | | | | | LB/T = 120 (default) |
| Immunity, ESD | 1b. | EDEB05 | AM2 433MHz | 862965082/14 | | | | | | | | | | | | | |
| | 1c. | EDEB1C | AM2 433MHz | 862965082/14 | | | | | | | | | | | | | |
| | 2a. | EDEB2A | AM2 418MHz | 862965081V3 | | | | | | | | | | | | | |
| | 2b. | EDEB2B | AM2 418MHz | 862965081V4 | | | | | | | | | | | | | |
| Immunity | 3a. | addr DvA | AR2 433 MHz | 86120692 | 86121231 | ANTENNA 4118/434 MHz CPL | 85821782V9 | none | none | none | none | none | 4 ch | Receiver only | | | |
| Immunity | 3b. | addr DxE | AR2 433 MHz | 86120692 | 86121231 | ANTENNA 4118/434 MHz CPL | 85821782V9 | none | none | RF Pwr=111 +13 dBm | 4 ch | RF Pwr=111 +13 dBm | 4 ch | RF Pwr=111 +13 dBm | 4 ch | RF Pwr=111 +13 dBm | 4 ch |
| Emission | 3c. | addr DxE | AR2 433 MHz | 86120692 | 86121231 | ANTENNA 4118/434 MHz CPL | 85821782V9 | none | none | Cont TX mode | Cont TX mode | Cont TX mode | Cont TX mode | Cont TX mode | Cont TX mode | Cont TX mode | Cont TX mode |
| | 4a. | addr 0xC | AR2 418 MHz | 86120691 | 86121231 | ANTENNA 4118/434 MHz CPL | 85821782V9 | none | none | none | none | none | 4 ch | Receiver only | | | |
| Emission | 4b. | addr 0xD | AR2 418 MHz | 86120691 | 86121232 | ANTENNA SHORT 4118/433 CPL | 85821782V9 | none | none | RF Pwr=-900 -8 dBm | 1 ohm=3 | RF Pwr=-900 -8 dBm | 1 ohm=3 | RF Pwr=-900 -8 dBm | 1 ohm=3 | RF Pwr=-900 -8 dBm | 1 ohm=3 |
| Emission | 6a. | #42 | AM2 433MHz | 862965082/4 | | | | | | final ant matching | none | RF Pwr=101 +7 dBm | 1 ohm=0 | RF Pwr=101 +7 dBm | 1 ohm=0 | RF Pwr=101 +7 dBm | 1 ohm=0 |
| Emission | 6b. | #43 | AM2 418MHz | 862965081V4 | | | | | | final ant matching | none | RF Pwr=001 -5 dBm | 1 ohm=0 | RF Pwr=001 -5 dBm | 1 ohm=0 | RF Pwr=001 -5 dBm | 1 ohm=0 |
| Emission | 6c. | #41 | AM2 418MHz | 862965081V4 | | | | | | final ant matching | none | | | | | | |
| E1.1 JNGUTNA_EU_KAPSLADE | | | | | | | | | | | | | | | | | |
| Immunity | 5a. | EDEB5A | AM2 418MHz | 862965081V3 | | | | | | none | none | No RFID back-off | RF Pwr=101 +7 dBm | 4 ch | | | |
| Immunity | 5b. | EDEB5B | AM2 433MHz | 862965082/4 | | | | | | none | none | No RFID back-off | RF Pwr=001 -2 dBm | 4 ch | LB/T = 100 | | |
| Immunity | 5c. | EDEB5C | AM2 433MHz | 862965082/4 | | | | | | none | none | No RFID back-off | RF Pwr=101 +7 dBm | 4 ch | LB/T = 130 | | |
| Immunity | 5d. | EDEB5D | AM2 433MHz | 862965082/4 | | | | | | none | none | No RFID back-off | RF Pwr=101 +7 dBm | 4 ch | LB/T = 110 | | |
| Ext cond | 7a. | | AM2 433MHz | 862965082/4 | | | | | | RF connector | Cont TX mode | Cont TX mode | Cont TX mode | Cont TX mode | Cont TX mode | Cont TX mode | |
| Ext cond | 7b. | EDEB02 | AM2 433MHz | 862965082/4 | (reserv) | | | | | RF connector | Cont TX mode | Cont TX mode | Cont TX mode | Cont TX mode | Cont TX mode | Cont TX mode | |
| E1.2 JNGUTNA_EU_KAPSLADE | | | | | | | | | | | | | | | | | |
| Ext cond | 8a. | | AM2 433MHz | 862965082/4 | | | | | | none | none | No RFID back-off | RF Pwr=101 +7 dBm | 1 ohm=0 | | | |
| Ext cond | 8b. | | AM2 433MHz | 862965082/4 | | | | | | none | none | No RFID back-off | RF Pwr=101 +7 dBm | 1 ohm=0 | | | |